Supplementary Material
Bound and unbound (ro)vibrational states of the methane-argon dimer

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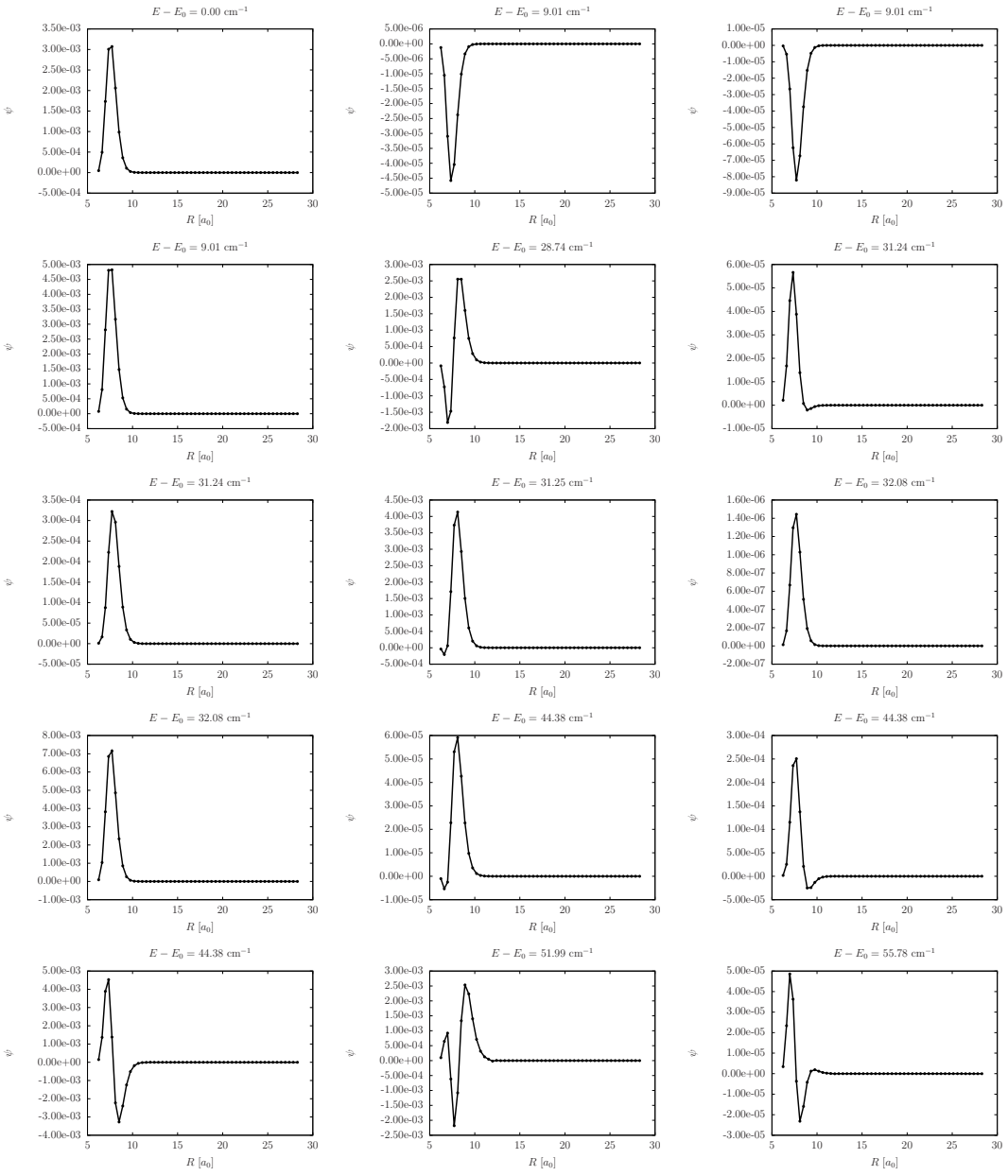
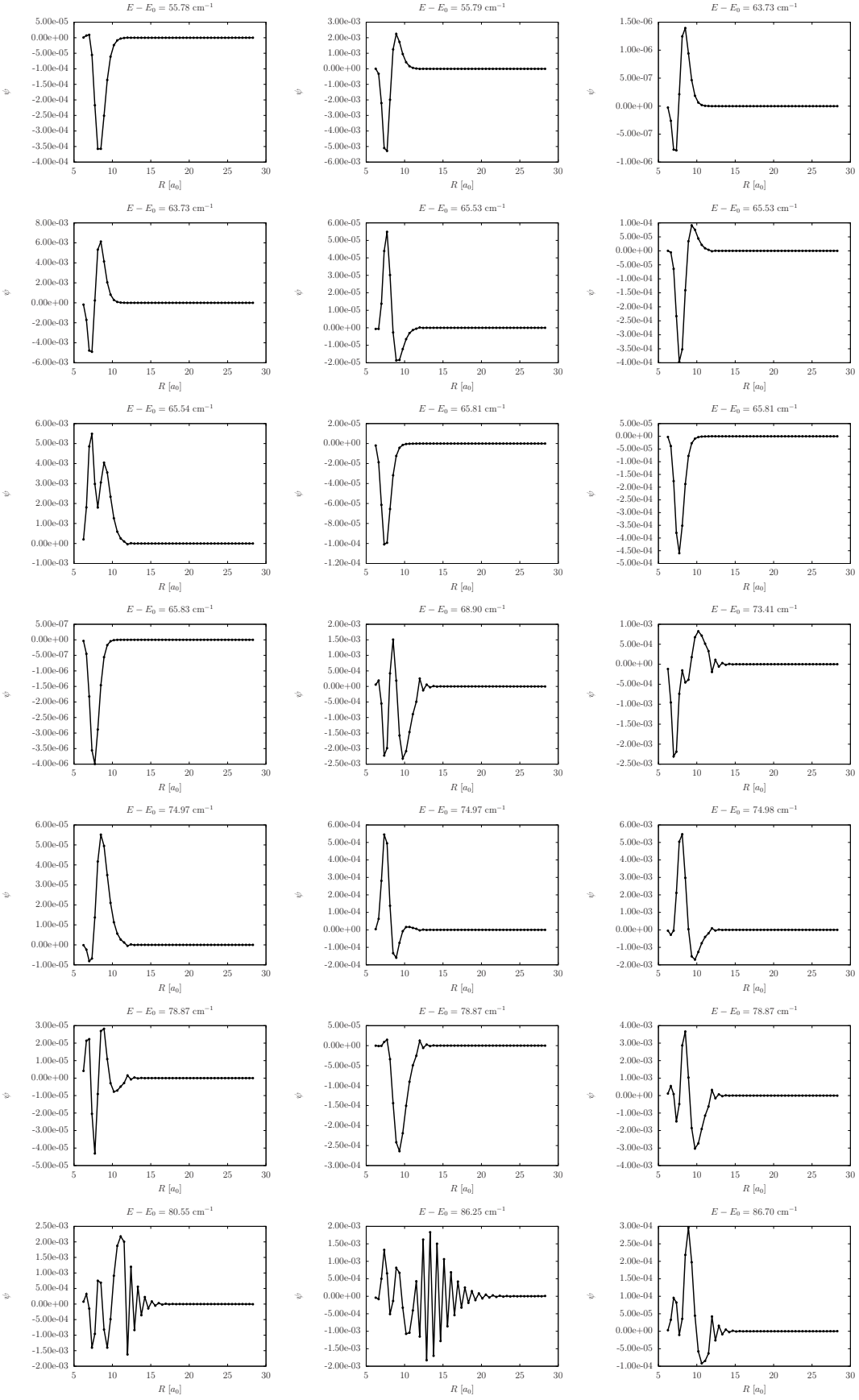
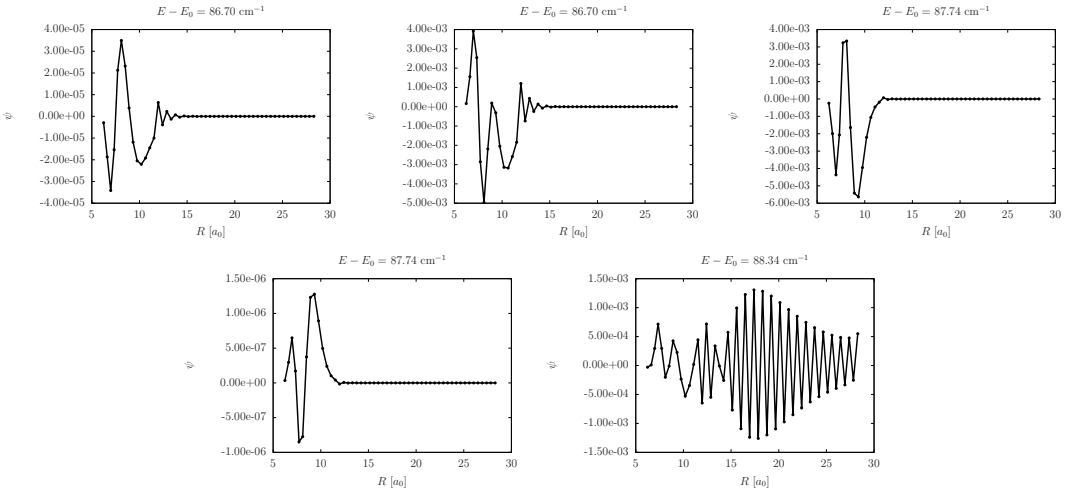
I. SUPPLEMENTARY MATERIAL

A. Wave functions

The one dimensional cuts of the vibrational wave functions alog the R coordinate are presented here. The radial coordinates were constrained in the global minimum structure $\theta = 54.7355°, \phi = 0.0000°$.




$E - E_0 = 55.78\ \mathrm{cm}^{-1}$
$E - E_0 = 55.79\ \mathrm{cm}^{-1}$
$E - E_0 = 63.73\ \mathrm{cm}^{-1}$
$E - E_0 = 63.73\ \mathrm{cm}^{-1}$
$E - E_0 = 65.53\ \mathrm{cm}^{-1}$
$E - E_0 = 65.53\ \mathrm{cm}^{-1}$
$E - E_0 = 65.54\ \mathrm{cm}^{-1}$
$E - E_0 = 65.81\ \mathrm{cm}^{-1}$
$E - E_0 = 65.81\ \mathrm{cm}^{-1}$
$E - E_0 = 65.83\ \mathrm{cm}^{-1}$
$E - E_0 = 68.90\ \mathrm{cm}^{-1}$
$E - E_0 = 73.41\ \mathrm{cm}^{-1}$
$E - E_0 = 74.97\ \mathrm{cm}^{-1}$
$E - E_0 = 74.97\ \mathrm{cm}^{-1}$
$E - E_0 = 74.98\ \mathrm{cm}^{-1}$
$E - E_0 = 78.87\ \mathrm{cm}^{-1}$
$E - E_0 = 78.87\ \mathrm{cm}^{-1}$
$E - E_0 = 78.87\ \mathrm{cm}^{-1}$
$E - E_0 = 80.55\ \mathrm{cm}^{-1}$
$E - E_0 = 86.25\ \mathrm{cm}^{-1}$
$E - E_0 = 86.70\ \mathrm{cm}^{-1}$
ψ
$R\ [a_0]$



B. Character tables

TABLE I: Character table of the T_{d}(M) molecular symmetry group.

T_{d}(M)	E	(123)	(14)(23)	[(1423)]*	[(23)]*
n_{cl}	1	8	3	6	6
A_1	1	1	1	1	1
A_2	1	1	1	−1	−1
E	2	−1	2	0	0
F_1	3	0	−1	1	−1
F_2	3	0	−1	−1	1

TABLE II: Character table of the $C_{3\mathrm{v}}$(M) molecular symmetry group.

$C_{3\mathrm{v}}$(M)	E	(123)	[(23)]*
n_{cl}	1	2	3
A_1	1	1	1
A_2	1	1	−1
E	2	−1	0

TABLE III: Character table of the C_{2v}(M) molecular symmetry group.

C_{2v}(M)	E	(12)(34)	[(12)]*	[(34)]*
n_{cl}	1	1	1	1
A_1	1	1	1	1
A_2	1	1	−1	−1
B_1	1	−1	1	−1
B_2	1	−1	−1	1